

PLANT PARASITIC NEMATODES ASSOCIATED WITH ARDISIA IN FLORIDA

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Several species of Ardisia (family Myrsinaceae) are grown as ornamental plants. These attractive plants, with shiny, dark green leaves and clusters of red berries, are sometimes used in landscaping as woody shrubs and are also grown commercially for use in terrariums and dish gardens. Ardisia crenata Sims is the predominant species grown commercially in Florida.

Based on samples collected in Florida and received by the Bureau of Nematology of the Division of Plant Industry during the past 20 years, plant parasitic nematodes were associated with Ardisia at approximately 60% of the sites where Ardisia was sampled. The following nematode genera were associated with Ardisia species: Belonolaimus, Criconemoides, Helicotylenchus, Hoplolaimus, Meloidogyne, Pratylenchus, Scutellonema, Trichodorus, and Tylenchorhynchus. Root-knot nematodes were the most frequently found. One or more Meloidogyne species occurred in 71% of all Ardisia samples in which plant parasitic nematodes were found (Unpublished Division of Plant Industry Records).

Pathogenicity studies by the author indicate that at least three root-knot nematode species, M. arenaria (Neal) Chitwood, M. incognita (Kofoid and White) Chitwood, and M. javanica (Treub.) Chitwood cause galls on roots of A. crenata. At high inoculum levels (100,000 eggs/4-inch pot), these species of Meloidogyne caused stunting and chlorosis of Ardisia (Fig. 1). After twelve weeks, dry top weights of plants inoculated with M. incognita, M. arenaria, and M. javanica were 25%, 35%, and 47% lower, respectively, than the dry top weights of noninoculated check plants.

Root galls on Ardisia may also be caused by the crown gall organism, Agrobacterium tumefaciens (E. F. Smith & Town.) Conn. Meloidogyne javanica and A. tumefaciens have been found together on galled tissue of Ardisia (Fig. 2B) (1). Although it is

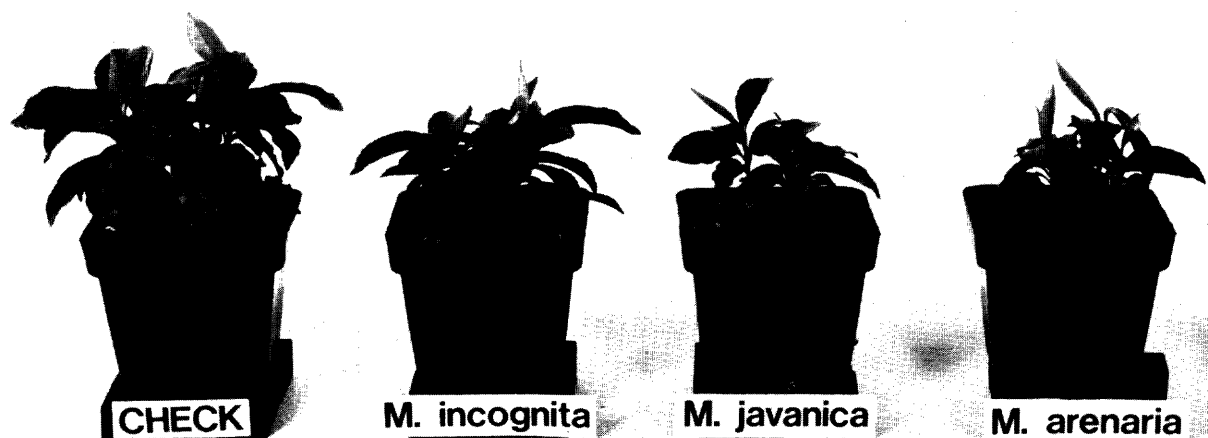


Fig. 1. Stunting of Ardisia crenata caused by three species of root-knot nematodes compared to normal growth of check plant. (Photo 12 weeks after inoculation) (DPI Photo #702148-4)

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not clear how root-knot nematodes and the crown gall bacteria interact, these two organisms are frequently found together on various host plants (1). These galls are generally larger, convoluted, and much rougher in texture than galls caused by root-knot nematodes alone (Fig. 1A and 1B).

There is a third type of Ardisia gall in which neither root-knot nematodes nor crown gall bacteria are involved as causal agents. These galls form at the cotyledonary and leaf axils of young Ardisia seedlings and are often induced by high temperatures (Fig. 2C) (2). Studies indicate that high temperatures are unfavorable for the reproduction of bacteria that live symbiotically on Ardisia foliage and are indirectly involved in the production of cytokinins, a plant hormone that is needed for normal plant development.

SURVEY AND DETECTION: Three types of galls may be detected on Ardisia. These may be caused by several species of root-knot nematode, crown gall bacteria, or interaction of both organisms. Galls may also be induced by high temperatures. If galls are observed on Ardisia, the surface texture and the location of the gall on the plant may indicate a probable causal agent, but samples should be submitted to a nematology and plant pathology laboratory for further diagnosis.

LITERATURE CITED:

1. Esser, R. P., A. P. Martinez, and K. R. Langdon. 1968. Simultaneous occurrences of root-knot nematode and crown gall bacteria. *Plant Dis. Repr.* 52:550-553.
2. Ridings, W. H., S. F. Fazli, and J. W. Miller. 1975. Temperature and other factors affecting the frequency of galling in Ardisia seedlings. *Proc. Fla. State Hort. Soc.* 88:578-583.

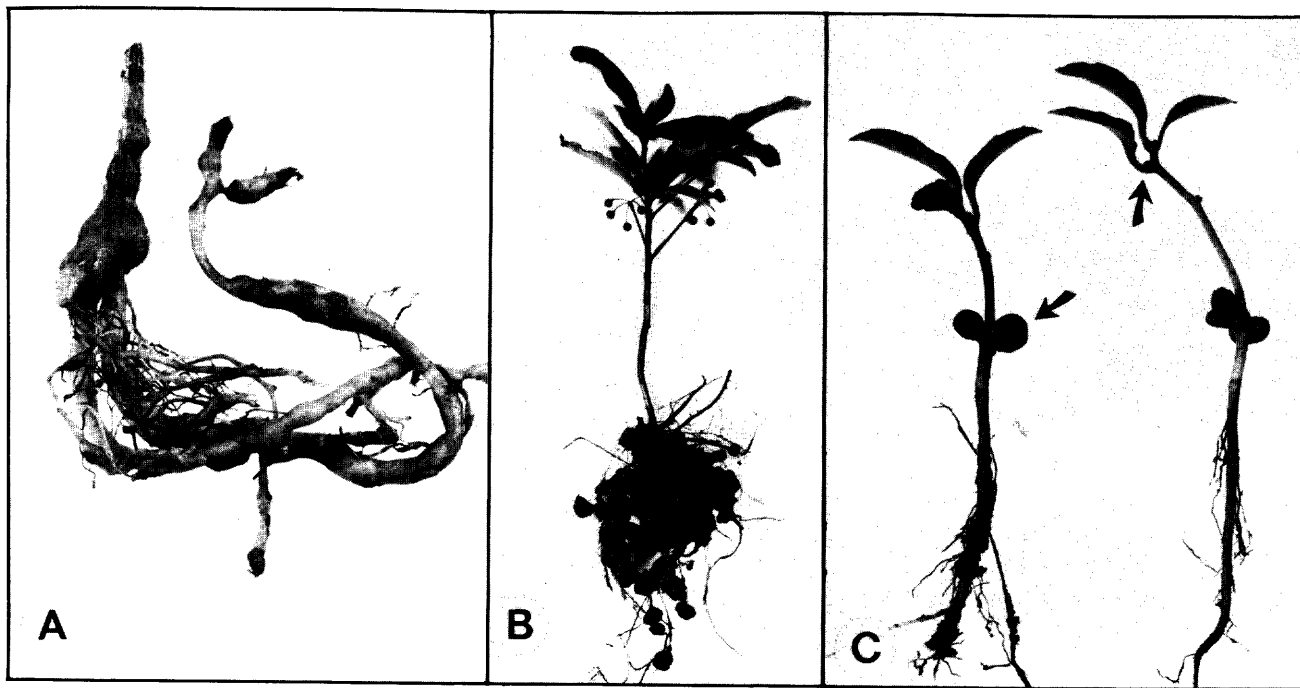


Fig. 2. Three types of galls found on Ardisia crenata. A. Close-up of galls caused by root-knot nematode, Meloidogyne javanica. B. Heavily galled roots with crown gall organism, Agrobacterium tumefaciens, and M. javanica. C. Cotyledonary node and leaf axil galls induced by high temperatures. (Photo credits: A. DPI Photo #702149-2; B. After Esser et al. 1968. C. After Ridings et al. 1975.)